



Program/Project Management Development Process Support Materials

September 1999

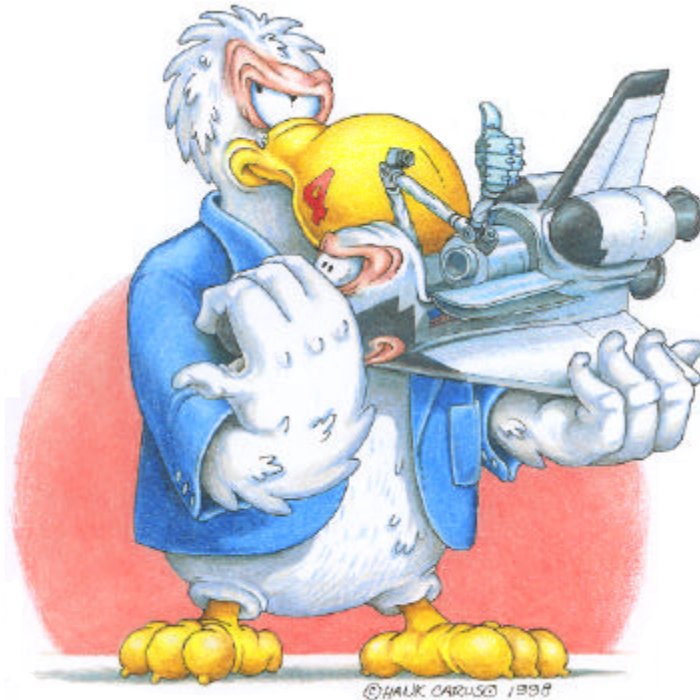


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FOREWORD

During dynamic and turbulent times, the only constant theme is change. At NASA, we are current of significant change, including shrinking budgets; downsizing; ISO-9000; full-cost management, “better, faster, cheaper” strategic management; Government Performance Results Act (GPRA); new guidelines and policy for program/project management; to name a few. The list could continue for many pages.

Within the discipline of project management, all of these changes are applicable and the implications are very direct. The new NPG 7120.5A -- NASA Program and Project Management Processes and Requirements -- represents a significant departure from past guidelines.

Previous PM Guidelines

Prescriptive
Rigid
Theoretical
Limited Applications
No discussion on the need for
professional development

New 7120.5A Guidelines

Permissive
Emphasis on Tailoring to Context
Functional
Broad Applications
Emphasis on Professional Development

These changes are necessary in a world of customer requirements, managing uncertainty, demanding for speed, and pressures for reduced cost. The only way to approach such a world is to have the accountability and freedom for flexibility, creativity, and non-bureaucratic decisions.

While such empowerment can be a great thing, it can also be a prescription for disaster if individuals and/or teams are not thoroughly equipped with the tools, skills, knowledge, and experience for optimal performance. **In other words . . . competence Is Essential!**

One of the central themes of current program and project management is the emphasis on taking the time for personal and organizational training. This is true in industry, government, and certainly within NASA. This guidebook represents the significant commitment NASA has made to achieve world-class project management expertise.

The *Program/Project Management Development Process (PMDP) Handbook (Version 3.0)* provides, under one cover, all of the information needed to initiate understanding, planning, implementation, and tracking of professional competencies linked to global standards for project management. The NASA PMDP represents an effort that has drawn praise from industry, other government agencies, and project management associations. It has been “borrowed” by other organizations and highlights NASA as an organization focused on learning, performance, and high standards.

This Handbook will provide the information and tools to get started in the field of PMDP. It provides detailed information about the PM competencies and requirements for the various levels of maturity, *based on NASA research!* It provides support and tools for establishing a baseline of

past experiences and accomplishments. The handbook will provide direction for establishing an Individual Development Plan (IDP) for continuous learning. It will also describe the importance of tracking and measuring progress.

Ultimately this handbook and PMDP will only be as useful as what the individual learns from it. Using this information, *in conjunction* with organization, management, mentor and individual perspectives, and tailoring will lead to useful application, development, and high competence.

One final note: notice this is Version 3.0. This is not only an indication of improvement over the past materials, but it also underscores NASA's commitment to continue to listen to feedback and improve PMDP. There are many significant improvements to this version, and there are more improvements and fine-tuning currently ongoing. There is no doubt that as long as NASA is dedicated to expertise in managing Programs, there will continue to be more versions and improvements.

Please review the materials. A little reflection time may lead to significant benefit. Call your training and development APPL professional to gain more support. Spend some time with your manager and a valued colleague to discuss the possibilities. Then, determine for yourself the value, investment, and time you want to make to further your goals and expertise.

Thanks for reading and do great things!

A handwritten signature in black ink, reading "Edward J. Hoffman", followed by a vertical line.

1.0 PURPOSE

The NASA *Program/Project Management Development Process (PMDP) Handbook (Version 3.0)* provides NASA's Program and Project Management (PM) community with a consolidated reference document that:

- Suggests a general road map for continuing professional development in program/project management.
- Provides NASA employees with a description of competencies required to perform the major tasks in program/project management.
- Offers employees and their supervisors a tool that identifies and sequences training and other developmental activities when preparing an Individual Development Plan (IDP).
- Assists supervisors in making effective use of increasingly scarce training resources by identifying competencies and training courses to schedule employee training attendance at appropriate courses at the appropriate time.
- Supports the consistent application of successful program/project management practices across NASA, thereby achieving goals and objectives as stated in the NASA Strategic Plan.

This Handbook, as well as information available in the *NASA Professional Development Guide* (see <http://www.hq.nasa.gov/office/codef/codeft/pdhub.html>), provides information to aid career development planning for members of the PM community. The PMDP is endorsed at the highest levels of the agency, and is used at all installations as a way to develop PM competency through work experiences supplemented by training, developmental assignments, academic courses, books, and other learning opportunities. The NASA PMDP has served as a model for industry organizations in a broad array of field operations.

The *PMDP Handbook (Version 3.0)* is intended to apply to all NASA employees, who are members of the PM community, and to others whose major duties include the functional support of programs and projects.

The materials included in this document are augmented by the NASA functional area offices and NASA installation materials included in the NASA PDI (Professional Development Initiative).

The emphasis on the use of this handbook is that it be *tailored* to the specific needs of the NASA employee. Elements of the model that are not applicable to the employee may be disregarded, while other elements that are not included may be incorporated into the employee's IDP. The key consideration is that the handbook and its associated companion materials be used as reference documents in the career planning process for NASA program and project managers.

2.0 PM CAREER DEVELOPMENT PHILOSOPHY

An employee's professional development is a shared responsibility of the employee and the supervisor and/or manager. In order to design successful careers, employees need to take responsibility to create career development plans, initiate actions that will lead them to their career goals, and document their progress, optimizing current and future employee contributions. This involvement includes periodic assessments of the employee's knowledge, skills, abilities, and experience. This assessment leads to the generation of an IDP, identifying work assignments and training that promote both NASA's and the employee's goals.

Professional development for an individual contributes to improved organizational performance, In establishing a PM career development plan, and sharing tools and approaches to become more valuable to the agency. For individuals serious about a profession in project management, documented accomplishments and planning for broader competency development is the key to maintaining marketability within NASA and private industry. Common tools and approaches will improve efficiency, decrease turnaround times, reduce down time, improve customer service, and cut costs. The purpose of career development is to enhance current performance standards and enable individuals to take full advantage of opportunities, while contributing to the achievement of NASA's goals and objectives. Nevertheless, career development cannot be directly associated with a promotion or increased pay -- there are no guarantees.

3.0 PMDP PROCESS AND INDIVIDUAL, MANAGEMENT AND ORGANIZATIONAL RESPONSIBILITIES

Career development is a shared responsibility among employees, managers/supervisors, and the organization. The following identifies the roles and minimum actions each should take to ensure effective PM career development:

Employees:

- Envision what they want their career to look like today, 5 years and 10 years in the future, taking into account NASA's vision, missions, and Enterprise goals
- Assess their aptitudes, strengths, and development needs with their mentor(s) and supervisor if feasible
- Seek mentor and supervisor input and prepare an IDP that supports both the current job and longer term professional goals within the work environment
- Work with their supervisor to schedule appropriate on-the-job training, required complementary formal training, and developmental activities
- Complete a Record of Accomplishments (RoA) and an Individual Development Plan (IDP) for their current level of PMDP, and forward to their Manager and to the Center Training Office

(See Appendix E for IDP preparation guidance, or complete a Center version of the document; a narrative statement is fine for completing a RoA form, as long as the narrative covers specifics as to how competencies were established, and display clear impact on NASA programs and projects. Appendix C identifies specific training/developmental experiences for the General/Technical Competencies).

Managers:

- Support the development and training of their subordinates and provide opportunities to discuss career goals and plans with each employee. This discussion should include organizational programs/projects in support of Agency missions, Enterprise goals, and Center initiatives
- Determine the job-related knowledge, skills, abilities and experience that employees need to effectively accomplish the work of the organization
- Mentor and coach employees in their professional development planning (See Appendix D) as feasible
- Help the employee define short-term and long-term development/training needs
- Review employee Record of Accomplishment (RoA) and Individual Development Plan (IDP)
- Approve placement of employees at Levels I and II of PMDP and forward documentation to the Center Training Office for maintenance and issuance of PMDP Certificate of Accomplishment
- Review and forward employee documentation with a recommendation for approval of their desired status if they meet the requirements to the Center Training Office, which will convene a Center PMDP Board for placement of the employee at Levels III and IV of PMDP. If they are a PMDP-Accelerating Leadership Option (PMDP-ALO) applicant, refer to Appendix F

Organizations:

- Ensure an organizational structure exists that supports the required knowledge, skills, abilities and experience development of Center employees
- Provide resources (dollars, time, coaches, mentors) for development to occur
- Provide a clear road map for career development activities based on PMDP general guidance
- Identify and use the talents, abilities and resources of each employee in support of organizational goals
- Develop a proactive and realistic approach to meeting future staffing needs
- Support the Center Training Office responsibilities of:
 - Maintaining all PMDP-related documentation
 - Encouraging and supporting the inclusion of PMDP in the recruitment and selection process for program/project managers at the Center
 - Encouraging and supporting development positions in Center-wide programs and projects for APPL PMDP participants
 - Giving at least one Center-wide PMDP briefing annually to a Center-wide audience
 - Providing mentorship to Center supervisors/managers and participants
 - Providing information and support the PMDP-ALO process (Appendix F) in coordination with the Center Human Resources/Personnel Office
 - Advising and supporting Center personnel on the PMDP, to include the Accelerating Leadership Option (ALO)
 - Maintaining current Center statistics on PMDP participation by Level
 - Notifying NASA APPL on Level I and II participants
 - Notifying the Center PMDP Board of required activities and coordinating the activities of the board on Level III and IV selections and ALO nominations
 - Marketing and advertising PMDP activities, products and services at the Center
- Designate a Center PMDP Board that is responsible for approving Level III and IV candidates

PMDP Process

The PMDP process is a voluntary activity that provides a roadmap for NASA program and project managers in terms of their development. The PMDP process is as follows:

- Employee reads the PMDP Guide and all related materials from NASA APPL. These candidates also contact NASA APPL and request assistance if required
- Employee contacts their supervisor and the Center Training Office for participation in PMDP
- Employee establishes a Record of Accomplishment form and targets a level of development (Level 1, 2, 3, or 4)
- Employee completes an accurate Individual Development Plan and obtains management commitment and approval
- For **Level 1**, the direct supervisor/manager forwards approval to the Center Training Office. The Center Training Office requests issuance of a PMDP Level 1 Certificate from NASA APPL. The Center Training Office maintains all employee PMDP records
- For **Level 2**, the direct supervisor/manager forwards approval to the Center Training Office. The Center Training Office requests issuance of a PMDP Level 2 Certificate

- from NASA APPL. The Center Training Office maintains all employee PMDP records.
- For **Levels 3 and 4**, the direct supervisor/manager forwards approval to the Center Training Office, which convenes a Center-specific review board. Upon board approval, the Center Training Office requests issuance of a PMDP Level 3 or 4 PMDP Certificate from NASA APPL, and NASA APPL forwards the name to the Chief Engineer's Office. The Center Training Office maintains all employee records.
 - The **IDP** must be periodically reviewed by the employee, manager, coaches, mentors, and NASA APPL to ensure progress towards goals is occurring

Special Considerations:

Center PMDP Boards

It is recommended that the Center PMDP Board consist of senior representatives from the following areas:

- Program and Project Offices
- Functional Staff Offices
- Training and Development
- Human Resources/Personnel
- PMDP Level III/IV peers

NASA APPL recommends that these senior representatives should serve for a 3-year term and meet as required (once per FY at a minimum).

If possible, the use of an existing mechanism within the Center is encouraged rather than the creation of a new Board.

Equivalencies

Training and/or academic equivalencies are not normally granted for NASA APPL required programs except in the case of documented NASA experience, such as with our current senior program and project managers. Equivalencies in terms of documented NASA experience can be granted on a case-by-case basis by the Center PMDP board for Levels 3 and 4, and by the Center Training Office for Levels 1 and 2. For a list of current required formal training programs, please refer to NPG 7120.5A, *NASA Program and Project Management Processes and Requirements*.

Training and/or academic equivalencies can be granted for NASA APPL non-required/elective programs (such as Project Start-Up and Project Implementation) by requesting a content audit through NASA APPL. These equivalencies can be granted on a case-by-case basis in comparing the curriculum of courses delivered by other vendors with ours.

4.0 GENERAL CAREER PATHS

The NASA *PMDP Handbook (Version 3.0)* identifies typical career paths of PM personnel in the course of their careers. Remember that there may be significant deviation from these identified career paths based on the unique requirements of the agency, installations, and employees.

Career paths identify job progression opportunities and provide employees with assistance in pursuing their career goals. This section of the *PMDP Handbook (Version 3.0)* illustrates the primary career paths within the PM community. Studying these paths will lead to a better understanding of potential career options and will result in more effective career planning.

The original study, *Career Development for Project Management (1993)*, defined a career path in a sequence of job positions and experiences which could lead to a specific career level, such as project, program or engineering management in NASA. A key thing to remember is that the Career Path chart should be interpreted with caution; it does not prescribe specific jobs against specific number of years, but rather a snapshot of possible career paths within the agency, typical time profiles with potential job titles, and how movement may occur between engineering, project, and program organizations.

(Refer to the Career Path Chart, which can be obtained from your Center Training Point-of-Contact, or visit the APPL website and view the chart on-line).

5.0 PMDP LEVELS

The PMDP Career Development model consists of four career levels, reflecting increased responsibilities and performance expectations as employees develop in their careers. These four levels and their associated performance expectations are described as follows:

Level 1 Capability/ Personnel (Discipline Experts):



- Performs fundamental, basic, and routine activities, while gaining subject matter expertise in requirements definition, using a Work Breakdown Structure in project planning, estimating project risk, cost/schedule estimation, and reporting of work elements, budgeting concepts, scheduling concepts, configuration management, and baseline control.
- Contributes to project activities, such as annual POP inputs, configuration management reviews, specific contribution, as specified in a project WBS, and the schedule/cost reporting process.
- Prepares metrics for achievement of performance requirements geared towards recall of appropriate Level 1 basic policies/procedures and application of appropriate policies/procedures in work and developmental activities.

Level 2 Capability/ Project Manager (Subsystems Level):



- Performs management of a simple project (for example, no more than one or two simple internal/external interfaces, smaller team, simpler contracting processes, smaller budget, shorter duration, etc.).
- Contributes to a larger system effort by assisting in project requirements definition, planning and budgeting, WBS development and use, project schedule development and use, risk planning, establishment of project cost/schedule/technical baselines, selection and use of appropriate reports, application of configuration management, hardware/software integration, testing and evaluation, contract management process and review, and team facilitative leadership.
- Prepares metrics for achievement of performance requirements to include recall and application of appropriate Level 1 and Level 2 knowledges/skills and adaptation to specific situations and challenges in a Level 2 project environment.

Level 3 Capability/ Project Manager (Systems Level):



- Performs management of a more complex project (possibly three distinct subsystems/parts/pieces, or other defined services, capabilities, or products) with associated interfaces.
- Contributes to a larger project or program by taking leadership responsibility and management in the initiation and/or development of content/skill areas specified in the PMDP model, and demonstrates successful top-level management of subordinate elements that are developing in parallel (systems integration).
- Prepares metrics for achievement of performance requirements to include recall, application, and adaptation of appropriate Level 1, Level 2, and Level 3 knowledges/skills, and an extension of application, analysis, and synthesis of original solutions to project situations and challenges in a Level 3 project environment; evaluation, assessment, and development of Level 1 and Level 2 personnel becomes critical.

Level 4 Capability/ Program Manager:



- Performs management of a complex program or a set of complex projects with multiple associated interfaces.
- Sets the organizational climate for the overall effort, and effectively adapts to political and strategic realities so that the overall effort remains viable (boundary-spanning).
- Prepares metrics for achievement of performance requirements to include the requirements of all previous levels and the additional application of appropriate and substantiated criteria (experiential and original) to PM situations and challenges in a Level 4 program environment; policy development and evaluation; assessment and development of all Levels becomes critical.

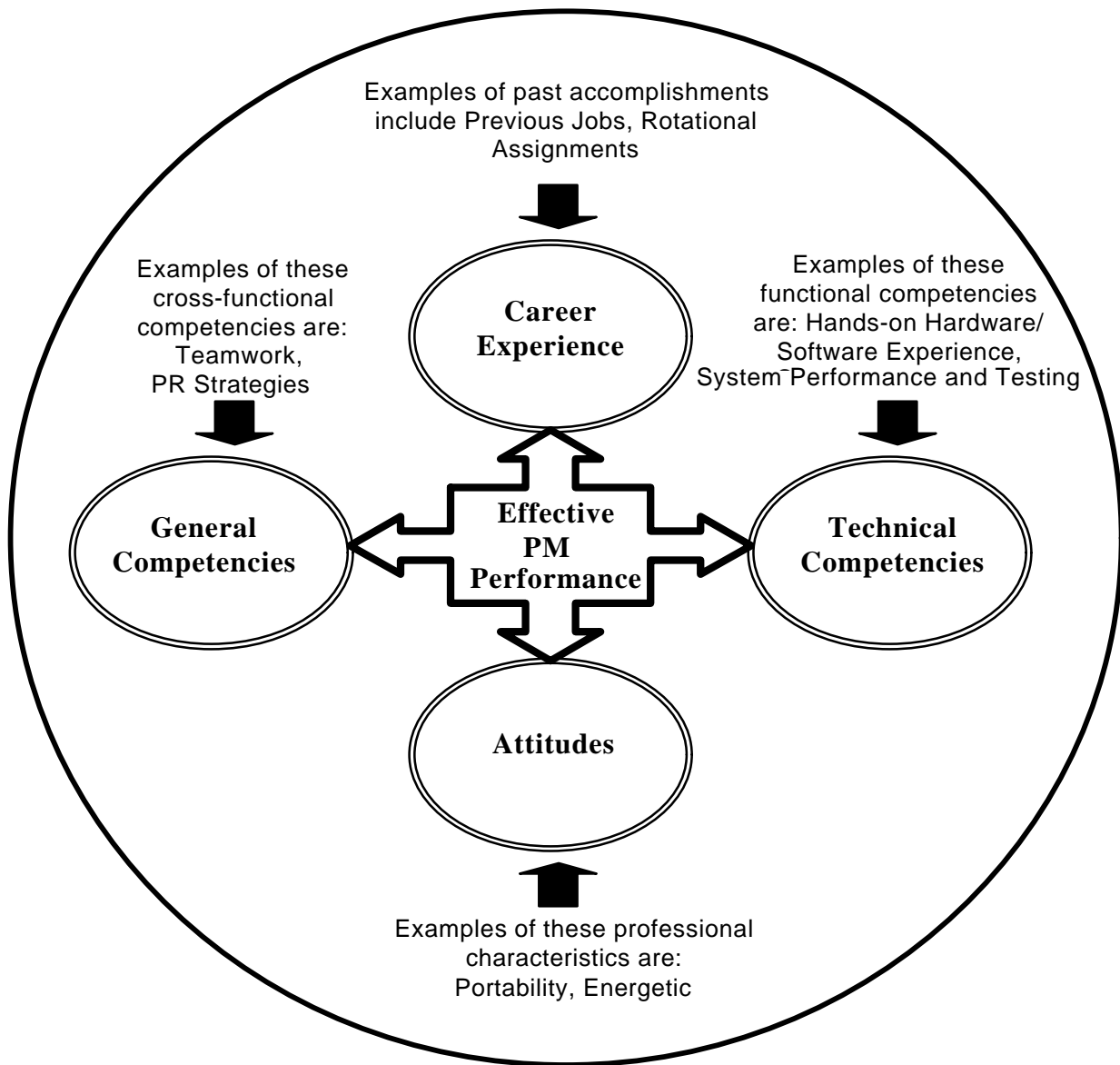
6.0 GENERAL AND TECHNICAL COMPETENCIES

This *PMDP Handbook (Version 3.0)* defines the types of competencies that are suggested for NASA employees in the NASA PM community. General PM competencies apply to the performance of all job categories, regardless of specific duties. Therefore, regardless of job position or organizational level, general competencies can apply to everyone in the PM community. At the present time, all competency categories are considered general **except** for Technical Performance.

Technical competencies correlate to the functional expertise required for one's job category. Technical competencies do not automatically generalize to more than one job category. Currently in the PMDP model, only Technical Performance (in terms of PM engineering ability) is considered a technical competency category for NASA PMs. Technical competencies for CFO, Information Technology (IT), Research and Development (R&D), and other NASA Professional Administrative Support communities are contained in separate competency models that have or are currently being developed specifically for their distinct requirements.

The next page displays the factors that impact on effective PM performance in NASA. These factors are career experience, general competencies, technical competencies, and attitudes.

Factors Impacting PM Performance



Appendix B defines the technical and general competencies required at each career stage for NASA PM Engineers.

7.0 ATTITUDES

Attitudes are predispositions to behaving in a certain way. Sometimes they are manifestations of innate talents. In other instances, they are learned through life experience. Normally, training does not affect attitudes in any substantial way. Nevertheless, attitudes can change through perseverance and practice. One of the most successful management books, *7 Habits of Highly Effective People* by Stephen Covey emphasizes that attitudes can be developed.

Attitudes, although observable, are very difficult to measure. Despite this fact, highly successful managers in the PM community agree that the following attitudes are required to excel:

- Portability -- Willingness to rotate through various cross-functional assignments.
- Energetic -- Possesses and exhibits a sense of urgency.
- Willingness to Learn -- Displays a belief in the importance of learning better ways to do the job at hand.
- Independence -- Possesses strong conviction and confidence in personal abilities and capability to accomplish the mission (a “self-starter” and follows through).

8.0 TRAINING AND DEVELOPMENTAL EXPERIENCES

To support full utilization of the NASA workforce in achieving NASA's strategic outcomes, it is agency policy to make training and developmental opportunities widely available to PM employees to:

- Enhance individual capabilities.
- Build and retain a skilled and effective PM workforce.
- Improve organizational performance.
- Maintain scientific, professional, technical, and management proficiency.

PMs can enhance job performance and develop employee's knowledge, skills, and abilities through:

- On-the-job work experience.
- Developmental assignments, both internal and external to one's work unit and/or installation.
- Formal training and educational experiences.

See Appendix A for a more in-depth discussion of Training and Developmental Experiences, including those that aid achievement of relevant technical competencies.

9.0 INDIVIDUAL DEVELOPMENT PLAN (IDP)

The IDP is a concept that emphasizes discussion and joint decisions by the employee and the supervisor on the specific developmental experiences necessary to fulfill the mutual goals of individual career development and organizational enhancement. Each IDP is uniquely tailored to the needs of the individual and the organization. One might identify extensive skill training; another might emphasize a more academic approach. There is no set pattern -- the term “individual” is basic to the concept - especially as it applies to the employee’s willingness and capacity to learn and grow. Using the *PMDP Handbook (Version 3.0)*, every PM employee should be able to develop an IDP that identifies their short- and long-term career goals and the training and other developmental experiences needed to achieve those goals.

Appendix E provides guidance on establishing mentoring and coaching relationships, which can facilitate development of an IDP and achievement of career goals. Appendix D provides guidance and worksheets to develop an IDP, clarifying and documenting your career aspirations.

10.0 HOW TO USE THIS HANDBOOK

To derive maximum benefit from the *PMDP Handbook (Version 3.0)*, consider the following steps:

1. Determine the benefits that PMDP provides for you by reading the Foreword and Sections 1-10 of this Handbook to learn about the NASA PM career development philosophy, potential career paths available within the PM community, and the key concepts and terms needed for employees and supervisors to jointly generate an IDP. Reading Appendix G, PM Career Development Implementation Plan, will provide a general understanding of the major elements of the career development program within the NASA PM community.
2. Review PMDP materials with your manager/supervisor to include associated training and developmental experiences identified in the *PMDP Full-Color Chart*, the *on-line PMDP model*, and the tables provided in this Handbook. These materials are available from your Center PMDP Point-of-Contact.
3. Choose the appropriate worksheets in Appendix E of this Handbook, including a Record of Accomplishment (ROA) that includes work experiences, academic learning, and formal training establishing your present level of PM competence.
4. Determine your target level of development. Work with your manager/supervisor to determine the appropriate level among the four levels of PMDP.
5. Establish your IDP. Make sure that you obtain management approval and commitment.
6. Implement your action plan and document your progress. Periodically review the IDP for potential adjustments. A review at the mid-term of your performance period and at the beginning of a new performance period may prove useful. Schedule periodic times to discuss your progress with your manager/supervisor and other valued mentors.

APPENDIX A

TRAINING AND DEVELOPMENTAL EXPERIENCES

Policy

To support the full utilization of the NASA workforce in achieving NASA's strategic outcomes, it is the agency's policy to make training and developmental opportunities widely available to employees to:

- Enhance individual capabilities.
- Build and retain a skilled and effective workforce.
- Improve organizational performance.
- Maintain scientific, professional, technical, and management proficiency.

More specifically, NASA's policy is to:

- Use on-the-job work experiences as the primary method of developing the job-related knowledge, skills, and abilities of employees.
- Support systematic plans to broaden employees' knowledge and skills through planned, work-related developmental assignments including "on-the-job" training, rotational assignments, and non-NASA work experiences.
- Use formal training and educational experiences to complement work experiences.
- Require program/project managers as well as program/project personnel to have an annual minimum of 40 hours of project management-related training and are strongly encouraged to participate in at least another 40 hours of general training each year. In order to ensure personal and organizational commitment to training, IDPs shall be developed and supported by all project personnel and their managers. NASA senior management shall promote an environment which enables such continuous learning to occur.
- Support employee training, retraining, and organizational development activities leading to better ways of delivering services, improving work performance, and increasing the value of employee contributions to current and future agency missions.

The matrix on the following page (excerpted from the NPG 7120.5A NASA Program and Project Management Processes and Requirements) indicates the minimum formal training required. program/project personnel should supplement these requirements by taking additional formal training, which is person- and position-specific. A list of NASA PM training and development resources can be found through local training and development organizations as well as the NASA Academy of Program and Project Leadership website at:

<http://appl.hq.nasa.gov>

MATRIX OF REQUIRED TRAINING COURSES BY CAREER LEVEL	
Level of Development	Formal Training Courses (or equivalency)
Program Manager	NASA Program Management (PGM) NASA Advanced Project Management (APM) An Overview of NASA Program/Project Management: 7120.5A
Project Manager (Systems Level & Above)	NASA Advanced Project Management (APM) An Overview of NASA Program/Project Management: 7120.5A
Project Manager (Subsystems Level)	NASA Project Management (PM) An Overview of NASA Program/Project Management: 7120.5A Systems Requirements Systems Engineering
Project Personnel (Discipline Experts)	NASA Project Leadership (PL) An Overview of NASA Program/Project Management: 7120.5A Foundations in Project Management

Developmental Activities

Developmental activities are structured work/training experiences, agreed to between employee and supervisor, with well-defined objectives intended to enhance job knowledge and skills. Some people refer to developmental activities as a combination of structured “on-the-job” activities and formal classroom training. Some developmental experiences are designed to broaden an employee’s knowledge and understanding of the agency through a combination of expanded work experiences and formal training. Others may be particularly related to specific job requirements when skill enhancement is required to properly perform a task.

Developmental work assignments, with appropriate levels of responsibility, can be beneficial to developing the competencies required of all NASA employees in the PM community. Developmental assignments can involve short work assignments outside one's own organization, but inside the installation. When broad and insightful knowledge of agency management and program operations is required, developmental work assignments outside of the home installation are an effective means of acquiring this experience.

PMDP participants are eligible for NASA PMDP developmental assignments to other installations, private industry, and academia. Current agency developmental opportunities are published on the NASA Headquarters web site at:

<http://www.hq.nasa.gov/office/codef/codeft/dp.html>

Rotational Assignments

Rotational assignments are a type of developmental experience. Rotational assignments benefit both the organization and the individual. As the federal workforce continues to experience streamlining, generalists with greater breadth and depth of knowledge and skills are increasingly in demand because of their flexibility and adaptability. These employees experience more intrinsic and extrinsic benefits in terms of job challenge, satisfaction, and visibility; greater recognition and awards; enhanced promotional opportunities; and increased marketability.

There are many types of rotational assignments. Some examples are:

- Cross-disciplinary, i.e., between project management and acquisition.
- Across PM job categories, i.e., between project engineer and functional manager.
- Assignment of tasks outside of normal responsibilities and within the current work unit.

Rotational assignments can occur within an installation, between NASA installations, on an interagency basis, between the public and private sectors, as well as between segments of the public sector (federal, state, and local).

In the IDP process, consideration should be given to identifying rotational assignments which involve realistic and attainable goals that will benefit both the individual and the organization.

Formal Training Activities

Formal training activities supplement the development of general and technical competencies. Each formal training activity usually consists of a well-defined lesson plan, specific training objectives, and a clear definition of learning objectives. The delivery of training may take one of several formats, and may be delivered by training vendors or NASA subject matter experts:

- Instructor/classroom-based training.
- Computer-based training.
- Train-the-trainer.
- Video/satellite-based training.
- Video and audio tapes.
- Telephone-based training.
- Intact work team training.
- Self-study.

Current instructor/classroom-based training within NASA is published both in hard copy and web format. This comprehensive list addresses the full range of PM-related agency training available to all job categories. Further, links are provided to external training vendors. Additional information on NASA-wide training opportunities are available at:

<http://www.hq.nasa.gov/office/codeft/codeft/acc.html>

APPENDIX B

COMPETENCY/TRAINING/DEVELOPMENT MATRICES

This appendix contains matrices for each level of PMDP. The level is identified in the top line of the matrix, and describes a generic profile of a PM in that level along with a short advice statement.

The matrices consist of 4 columns, described below:

Competency Categories -- specifies the category under which knowledge and skills for that particular PM level are organized.

Knowledge and Skills -- specifies the specific knowledge and skill requirements for that particular competency category at that particular PM level.

Work/Development Activities -- specifies activities that contribute to PM development for the identified knowledge and skill in the specified competency category at that particular PM Level.

Training Courses -- APPL-related courses that teach the identified knowledge and skill in the specified competency category at that particular PM Level.

APPENDIX C

The NASA Project Management Development Process (PMDP) - Accelerating Leadership Option (ALO)

The PMDP-ALO represents a natural progression of the current NASA education environment for our , future leaders of technical programs and projects in the areas of Earth Science, Space Science, Space Flight, and Aero-Space Technology. It is designed to provide technical program and project managers the opportunity to obtain systems perspective, gain hands-on experience, and develop the ability to perform insight duties in NASA aerospace endeavors. The PMDP-ALO blends the best of tailored practitioner experiences and academic learning to prepare future NASA technical program and project leaders in the system design of complex programs and sound business management practices.

What is the Project Management Development Process - Accelerating Leadership Option?

- Voluntary option for participants preparing for PMDP Levels III and IV.
- Product-oriented curriculum over and above standard developmental activities.
- Systematic approach focused on increasing NASA project management leadership capability.
- Controlled by Centers and Institutional Program Offices in coordination with the NASA Chief Engineer's Office through an open, competitive selection process from a pool of qualified candidates.
- Focus on integration and interrelationships of systems.
- Emphasis on management of safety, risk and uncertainty.
- Global perspective.
- Tailored to the individual as a set of opportunities, not requirements.
- NASA specific and relevant.
- Leverages strategic partnerships with industry and academia.
- Large hands-on technical/functional/leadership experience component.
- Building partnering and networking relationships.

Why the Project Management Development Process - Accelerating Leadership Option?

- Sound, complete preparation for future leaders of technical programs and projects.
- Fill experience gaps of current workforce due to downsizing.
- Preparation for future program leaders in system design and management.
- Need for practical, hands-on experiences for excellence in technical programs.
- Comprehensive technical, programmatic, leadership and functional emphasis.
- Develop and maintain the ability for program excellence.
- Utilize a variety of learning approaches to build strong interdisciplinary backgrounds.

What is the selection process for the Project Management Development Process - Accelerated Leadership Option?

- NASA APPL will initiate an open competitive selection process to place participants in the PMDP Accelerating Leadership Option (PMDP-ALO) program.
- Opportunity for consideration for the PMDP-ALO will be publicized under a single Agency-wide announcement that will be transmitted to all NASA Centers.
- Center Personnel Offices will review applications for minimum qualifications.
- A Center Panel will review qualified applicants against rating criteria and identify the best-qualified group.
- The best-qualified group will be referred to the Center Director for interview and selection.
- IPOs will concur on the final selection decisions from the Centers, ensuring that the selection is from a diverse pool of candidates and that strategic Agency goals are best served by the forwarded candidates.
- Selecting officials may use mentors, coaches, and supervisor feedback during the selection process.

What will the selection decision be-based on?

- Past technical program/project management with team leader responsibility for safety, cost, schedules, quality, customer satisfaction and mission accomplishment.
- Participation in PMDP at Level 2 (or equivalent experience) working toward Level 3 certification, or above.
- Demonstrated technical competence and functional skill expertise. Contributions to professional societies, academic publications, and presentations.
- Demonstrated leadership. Ability to meet all multi-element research and engineering activities.
- Ability to meet all entrance requirements for the MIT Master's of Science in Engineering Management program.

What does the Accelerating Leadership Option Core Curriculum consist of?

- NASA Academy/Massachusetts Institute of Technology Master's of Science in Engineering Management: The Academy will partner with the Massachusetts Institute of Technology to offer the System Design and Management program. This degree possesses significant distance learning and residency components and will be available to all Centers and Headquarters. The content focuses on the practitioner, and provides tremendous opportunities to network with industry professionals from aerospace and other industries. Elements of the program cover safety and risk from a systems perspective. Optional tracks that include Information Technology and Software Engineering will be included. The key components of the program focus on system design, product development, business management and leadership, and information technology.
- Program/Project Development Assignments: These developmental assignments are designed to expose promising leaders to challenges at technical program/project and

engineering deputy levels and other key positions within NASA in order to gain perspective a hands-on experience to better understand and support Agency initiatives.

These assignments will typically be up to 1 year. Mobility is a key criterion for availability of this option for candidates located at some Centers. This assignment will be coordinated with the Chief Engineer.

What do the electives for the PMDP-ALO program consist of?

- **Project Management Council Working Group/Engineering Management Council Rotation Assignments:** Developmental assignments will be made available on the Project Management Council Working Group and the Engineering Management Council. These assignments will allow for accelerated understanding and improved decision-making capability concerning issues important to project management and engineering within the Agency.
- **Industry Skills-Enhancement Visits:** Industry visits with leading private sector organizations will be arranged in order to learn cutting-edge engineering, functional, and project management methods and techniques, and to allow industry to learn best practices from NASA. This is one of the prime mechanisms for NASA to "fill the skill gaps" in the current workforce, thus promoting the ability of our future program/project leaders to provide "insight".
- **NASA Project Practitioner Instructor Pool:** Successful technical project managers will be designated to serve as Academy staff instructors upon completion of current projects, prior to new project assignment. These assignments to the Academy will be targeted at sharing expertise in terms of project management, functional skills, science, and engineering.
- **Expert Project Leader and Engineering Consultant Project Support:** NASA Accelerating Leadership Option project leaders will be used to improve the delivery of performance support initiatives across the Agency, focusing on project management, functional, and technical excellence capabilities on the part of the assigned instructors. These leaders are assigned upon request by the program/project.
- **"Best of the Best" Project Manager and Engineering Forum:** This semi-annual small elite program is designed as a 3-day meeting of the best of the best, similar to the concept of the NASA Senior Executive Service Leadership Program in terms of format and objectives. The forum is designed to allow for the sharing of successful project leadership and engineering best practices among the most successful of NASA practitioners.

- Center "Best Practices" Tours: These assignments allow for promising project leaders to serve as Center ambassadors of best practices to their sister Centers. The tour allows Enterprise Associate Administrators and Center Directors to prioritize their best practices and recruit the best representatives, thus accelerating buy-in and implementation of promising new methods and techniques in project management and technology across the Agency.
- Experienced Mentor/Sponsor Program: Accelerating Leadership Option participants are paired with successful role models in terms of project management and technical capability. The mentors are encouraged to spend time with the participants in order to answer questions and gain commitment to NASA values of project, science, functional, and engineering excellence. In addition, participants are assigned junior personnel to mentor as part of their developmental experience.
- NASA Administrator's Colloquium: This activity is a semi-annual meeting of Accelerating Leadership Option participants with the NASA Administrator in order to increase understanding of key project management and technical issues and share perspectives on those issues. Enterprise Associate Administrators will participate in this meeting.
- Academy Curriculum Steering Committee: Successful program and project leaders will be assigned to the Academy Curriculum Steering Committee in order to influence the creation and implementation of developmental activities in NASA. This will ensure the alignment of Academy activities with organizational and individual goals in terms of project management, functional, and technical excellence.
- The Project Mirror: The Project Mirror is a Project Management case-driven developmental simulation that allows project and program leaders to analyze data, make decisions, take action, make mistakes, and learn in a non-attributional project simulation environment. These simulations will cover both large scale and "faster, better, cheaper" programs and projects, will cover mission and research elements, and will emphasize how to produce things in a safe and reliable manner.
- NASA Collaboratory: A Virtual Project Management Community: This semi-annual on-line colloquium will be developed by NASA leaders for NASA leaders, covering issues that NASA must address in order to be successful in programs and projects, to include technical and functional issues related to project management excellence. The first interactive session is scheduled to cover safety, mission assurance and risk management. The on-line secure environment will give capabilities for keynote speakers, threaded discussions, e-mail, chat, downloadable materials, reading lists, assignments, and reporting capabilities.

APPENDIX D

MENTORING AND COACHING

Mentoring involves counseling others through formal or informal methods. A mentor willingly serves as a role model for his/her protégé, sharing organization insights and lessons learned. Mentors provide sound advice on career development goals, strategies, and options.

Coaching involves clearly communicating performance expectations to peers and employees, and openly sharing information for the benefit of the organization. Coaches also model and communicate the values, behaviors, and work practices expected of the workforce. Like a mentor, coaches provide constructive feedback. Coaching is normally done in the context of a supervisor-employee relationship and can be a daily activity.

Mentoring may be performed by managers or non-managers, both inside and outside an employee's organization. We recommend that every member of the PM community have a mentor. However, whether or not you have a mentor-protégé relationship is entirely up to you. Employees may choose to have more than one mentor. The need for a mentor should be discussed by you and your supervisor.

Mentoring involves guiding and nurturing the growth of others through various stages of their development. Mentoring is a technique with strategies and practices that can be learned. Generally speaking, a mentor is someone of substantial experience, talent, or professional standing who nurtures the career of a protégé (e.g., apprentice, intern, or understudy). Mentoring can be conducted through a formal program or by an informal understanding between a mentor and protégé. The best mentors combine technical competence, business acumen, relevant experience, the ability to effectively communicate, and most importantly, the ability to listen and provide candid and constructive feedback.

A mentor's role is informal and includes:

- Assisting protégés with recommendations for training and work experience at each of the career levels.
- Working with the supervisor to obtain special assignments and other activities that help complete IDP.
- Acting as a sounding board for career decisions, and providing information about important organizational issues.
- Meeting frequently and regularly with protégé to review progress.

The key steps in the mentoring process include:

- Reviewing this *PMDP Handbook (Version 3.0)*.
- Generating a personal vision (see preceding section).
- Career discussions with supervisor.
- Career discussions with mentor(s). (Note: A mentor can be a supervisor).

APPENDIX E

INDIVIDUAL DEVELOPMENT PLAN GUIDE

Introduction

Why should you be concerned about planning your career?

Because it is *your* career! If *you* don't take responsibility for the success of your career, then who will? Considering all the time and energy you spend at work, why not ensure you get maximum satisfaction from your work and career?

Additionally, NASA benefits from having a competent and motivated workforce, capable of “re-tooling” itself to meet the demands placed on it by constant organizational and technological changes within NASA.

The workplace has been affected by a number of significant changes or trends, which have definite ramifications for your career planning:

Less job security and employer loyalty: Gone is the era of high job security with the same employer for life, where good employees automatically move up well-defined career ladders. Even in the federal sector, in response to increased pressures to reduce costs, solutions like restructuring, downsizing, and automation will continue to eliminate some jobs and drastically alter others. Workers will, of necessity, need to be more mobile in finding the right job . . . and employer.

Up is not the only way: With the thinning of management positions and flattening of organizational structures, the traditional linear career patterns will be less available. Employees will need to be more flexible, adaptable, and creative in identifying their next job, and may need to consider lateral moves or rotational assignments to broaden their experience or leverage their skills.

Technical knowledge and skills obsolescence: Rapid advancements in technology and state-of-the-art knowledge requires employees to upgrade their skills and “re-tool” themselves just to remain current with their job requirements. For example, in high-tech organizations, the same skills have a half-life of 18 months. Also, missions and projects end and new ones start up, often requiring new or different technical skills or expertise from the workforce.

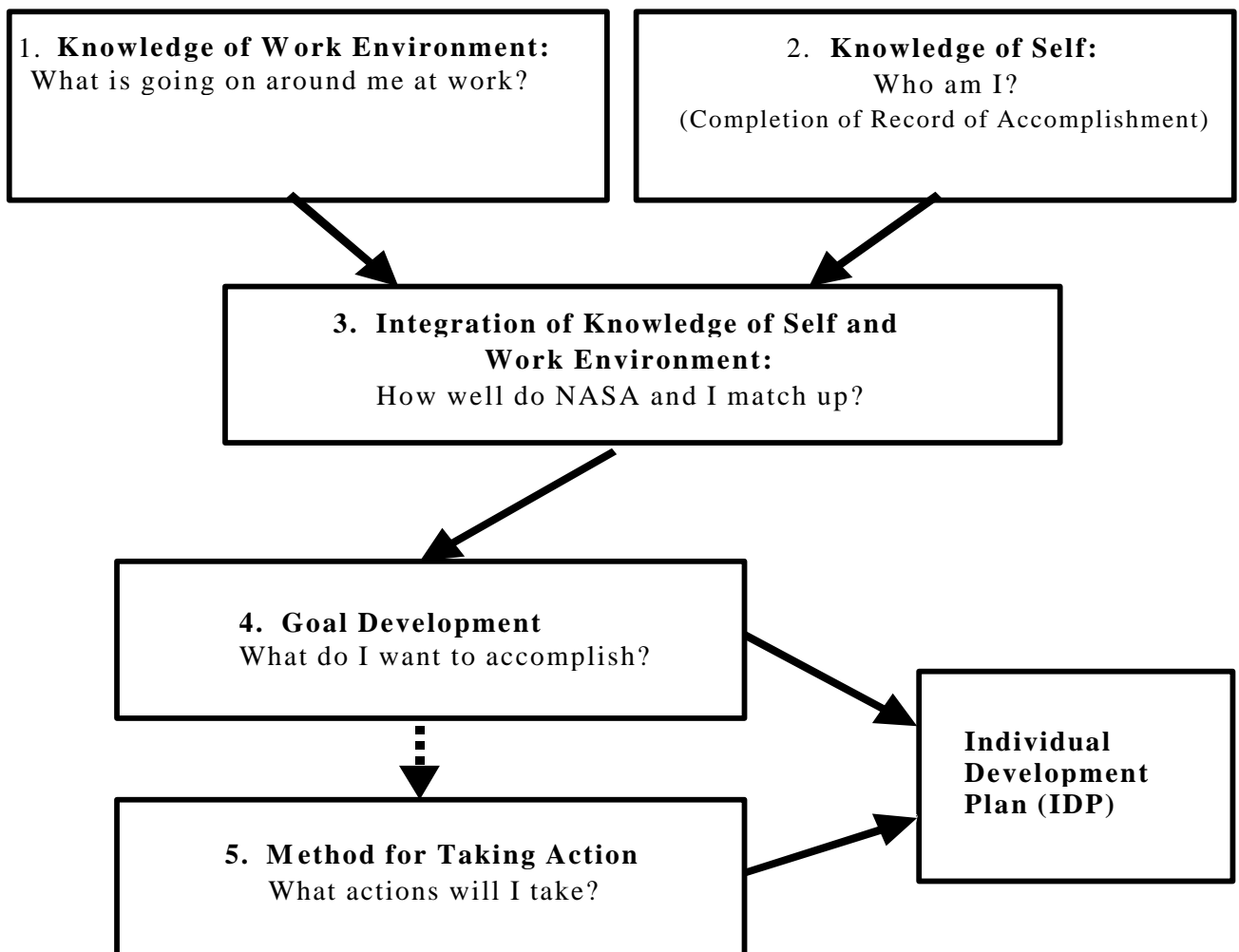
Project management standards: Many industry organizations are only hiring individuals who can demonstrate documented competence. Involvement in life-long learning through development planning is becoming a requirement for PM professionals. The competencies within the PMDP meet the requirements of global PM standards.

It is definitely to your advantage to position yourself for long-term employability in the rapidly changing world. Begin preparing now for the future.

How do you go about planning your career?

The diagram on this page illustrates the steps involved in the career planning process. Detailed worksheets to help you with each step are contained on the following pages, including information on Individual Development Plans (IDP).

STEPS IN CAREER PLANNING



What are your career issues?

How much time and effort you need to spend at any one step in the process depends on your *career issues*. It is important to be clear about these career issues, so that you can develop an effective strategy for dealing with them. Career issues cover a broad spectrum, ranging from getting up to speed in a new job, to making a major career field change, or planning your retirement. On the following page is a list of statements that reflect a full range of career issues people face at one time or another. Which ones are relevant for you now? Place an “X” in front of the statements that are true for you at this time.

Current Career Issues

- _____ You are new in your job and must learn the basics to get up to speed and feel comfortable and productive.
- _____ You have been in your job for a while and are striving for increased general competence.
- _____ You need to improve your performance in certain areas of your current job.
- _____ You need to update your skills or expertise to keep up with the changing technologies or state-of-the-art knowledge in your field of expertise.
- _____ Your job duties have changed recently (or will change), requiring some new skills or expertise on your part.
- _____ Your job may be eliminated due to reengineering or restructuring, and you want to begin “re-tooling” to be ready for future opportunities.
- _____ You want to prepare for a promotion or move to the next higher level of responsibility in your field of expertise.
- _____ You want to broaden your skills or expertise to allow yourself more flexibility for future job moves.
- _____ You want to change jobs within your current job category, and . . .
 - _____ stay at your installation.
 - _____ stay within NASA.
 - _____ stay in the federal government.
 - _____ leave the federal government.
- _____ You want to change job categories, and . . .
 - _____ stay at your installation.
 - _____ stay within NASA.
 - _____ stay in the federal government.
 - _____ leave the federal government.

- _____ You don't see much of a future if you remain in your current job, but aren't sure of your options.
- _____ You want to plan your retirement.
- _____ Other (fill in the blank, and continue on back if necessary).

Working the Career Planning Process

Now that you are a little more clear about your career issues, it is time to begin working the process. As with any major decision, you will need a certain amount of data upon which to make your career plan. The following worksheets are designed to help you generate relevant data for each step in the process. It pays to be as thorough as possible, so you may need to spend a significant amount of time at one or more steps. Refer to the *NASA Professional Development Guide* available on the web at <http://www.hq.nasa.gov/office/codef/codeft/pdhab.html>.

Please begin by completing the Work Environment Worksheet following, and continuing on through the worksheets provided.

Knowledge of Work Environment Worksheet

(What is going on around me at my installation and at NASA)?

1. How is the mission of my organization (e.g., branch, office, division, or lab) changing in terms of the NASA Strategic Plan and related Implementation Plans? What other changes are occurring regarding our customers, services/products, work processes, organizational structure, reporting relationships, and personnel? Is this a change of which I want to be a part, or is it time for me to consider a move?
2. What are the organization's changing needs regarding the workforce, and what new expertise and skills will be required or desirable?
3. What opportunities are available for developing these new expertise and skills (experiences, training, rotational assignments, professional conferences, mentoring, etc.)?
4. How might my role (job) change in my organization? How can I prepare for or develop new skills for these changes?
5. New expertise and skills my organization wants me to learn include . . .
6. What new missions or projects at my installation or within NASA appeal to me? What is the organization's future needs? What kinds of development activities would help position me for participation in another work project?

Knowledge of Self Worksheet

(Who am I)?

1. What have been my accomplishments that qualify me to perform as a project manager, or to contribute to the support of program/project activities? (**Complete the PMDP Record of Accomplishments Form** (ROA) located at the end of this worksheet. (This may be a long, but necessary, process and will pay off in the long run, since it is much like updating your resume in order to take advantage of PM opportunities. Once this is completed, go on to the questions below, using the ROA as a resource).
2. Of the new and recent developments in my organization or field, what interests me the most?
3. What are my current strengths for pursuing these interests? What do I need to do to reposition my career so that I can get involved in these new developments?
4. Is it time for me to consider working outside of my installation or NASA? If I am considering a complete career change, what experiences, training, and lessons learned, would help reposition my career in the direction of my new interests?
5. Of all the things I have done in the last five years (work and non-work related), what specific activities and functions have energized me the most? What developmental activities -- experiences, learning, skill-building -- would help me grow in or increase these energizing functions?
6. Other things I would like to learn are . . .
7. What non-work related issues do I need to consider that will likely impact my career plans (e.g., health, family, financial, social)?

Integration of Knowledge of Self and Work Environment Worksheet

(How well my organization and I match)?

1. In what areas do my interests and personal plans overlap with the changing needs of my organization? (Any areas of overlap represent “first choice” development targets).
2. What knowledge, skills, or abilities are important for increasing or maintaining the quality of my performance in my present assignments? (Lack of attention to these development needs will surely affect my opportunities).
3. What knowledge, skills, or abilities would help prepare me for opportunities or roles I might have in the future?
4. Compared to the development needs suggested by these factors, other interests for development that are important to me include . . .

Goal Development Worksheet

(What do I want to accomplish)?

A goal is a statement of a desired outcome or accomplishment, which is specific, observable and realistic. Based on the data you have generated about yourself on the previous worksheets and your specific career issues, write some goals for the next one, two and three years.

1. What I want to accomplish by this time next year is . . .
2. What I want to accomplish by the end of the second year is . . .
3. What I want to accomplish by the end of the third year is . . .
4. What barriers or obstacles might prevent me from accomplishing my goals (e.g., time, money, other commitments, etc.)?
5. What can I do to overcome these barriers or obstacles? What resources are available to help me?

Method for Taking Action Worksheet

(What actions will I take)?

1. There is a wide range of potential actions for me to consider in order to achieve my goals:

- _____ New assignments in my current job.
- _____ Rotation to a different project/job.
- _____ Seek mentor(s).
- _____ Volunteer for a task force or process action team.
- _____ On-the-job learning from someone who is more of an expert in a specific area.
- _____ Seminars/conferences (on-site and off-site).
- _____ University courses.
- _____ Commercial/contracted courses.
- _____ Self-paced learning (books, videos, computer-based instruction, etc.).
- _____ Academic degree or certification program.
- _____ Sabbatical leave.
- _____ Conduct informational interviews.
- _____ Move to a new job within my installation.
- _____ Move to a new job within NASA or the federal government.
- _____ Move to a new job outside of the federal government.
- _____ Start my own business.
- _____ Plan retirement.
- _____ Other actions: _____

2. In planning my career moves, one must be willing to consider all the possibilities. “Up” is not the only way (i.e., moving from a staff to a line position). One must be willing to consider these moves:

Lateral Move: Change in position within or outside an organization, but not necessarily a change in status or pay.

Job Enrichment: Expand or change a job in order to provide growth experiences.

Exploration: Identify other jobs that require individual skills, interests, and values. Job rotation is an example.

Downshifting: Taking an assignment or job at a lower level of responsibility, rank, and/or salary in order to reposition career in something new, interesting, may have upward potential, or to achieve a better balance between work and personal life.

Change Work Setting: No significant change in job duties, but have a different boss, organization, or employer.

No Change: Do nothing, but only after careful consideration.

Your Individual Development Plan

To the extent that any of your career goals involve acquiring some new skills or expertise, an IDP will be very helpful. Using the attached IDP form, begin drafting your plan by incorporating the goals you formulated on the “Goal Development Worksheet” and the relevant actions from the “Method for Taking Action Worksheet”. In selecting actions, try to achieve a balance between formal training activities (e.g., courses, seminars) and other kinds of learning experiences (e.g., work assignments, books). Also, include realistic timeframes for completing your actions.

Your Supervisor’s Role

Your supervisor is in an excellent position to support your development in several ways by:

- Providing feedback on your performance in your current job and identifying your strengths and areas for improvement.
- Acting as a mentor and coach.
- Representing the organization’s needs, goals, and opportunities.
- Letting you know what is happening around your installation and within NASA.
- Helping assess your advancement potential and your qualifications for other positions.
- Acting as a resource and referral for exploring your options.
- Supporting your training and development; providing training opportunities and funding, if related to NASA’s mission.

APPENDIX F

CERTIFICATION AND CONTINUING PROFESSIONAL EDUCATION

Certification is a process that formally recognizes professionals for achieving expertise and excellence in their field and is a means to encourage employees to continue their education and hone their professional skills. Certification programs are sponsored primarily by states and professional associations. Certification requirements typically consist of specific types of formal education and experience, character references and passing an examination. To maintain certification, there may also be a continuing education requirements.

Since certification provides recognition for achievement of professional excellence, NASA encourages its PM employees to seek certification appropriate to their occupation.

The following is a list of the types of certification of interest to the PM community. This is not an exhaustive list. You are encouraged to participate in the following, or similar professional associations, many of which offer certification programs. Some of the other national organizations that pertain to the PM community include: Project Management Institute (PMI), Performance Management Association (PMA), International Society of Parametric Analysis (ISPA), and National Management Association (NMA).

Many colleges and universities also offer continuing education programs appropriate to the development of new knowledge/skills and to the updating of existing knowledge/skills. Additionally, the USDA Graduate School offers programs and certifications that are tailored specifically to the government sector.

American Society for Quality (ASQ)

The ASQ, through its certification program, offers formal peer recognition that an individual has demonstrated a proficiency within and a comprehension of a specified body of knowledge at a point in time. Five certifications are offered, two of interest to the PM community: Quality Auditor and Quality Technician Certification. For additional information, access the ASQ web site at <http://www.asq.org/standcert/cert.html>

Project Management Institute (PMI)

The PMI sponsors a Project Management Professional Certification Program. Information concerning certification options is available at the PMI web site at: <http://www.pmi.org/certification/>

Graduate School, USDA

Information on programs offered by the USDA GS can be found at: <http://grad.usda.gov>

APPENDIX G

PM CAREER DEVELOPMENT IMPLEMENTATION PLAN

The PM Career Development Implementation Plan (CDIP) operationalizes the key tenets of the *NASA Strategic Plan* (NPD-1000.1) and the *NASA Strategic Management Handbook*. The PM CDIP supports the cross-cutting processes addressed in the *NASA Strategic Plan* and the *NASA Strategic Management Handbook*. Support for these tenets and cross-cutting processes include:

- Manage strategically by:
 - Implementing performance measures directly related to job requirements.
 - Recruiting, developing, and retaining the “best and brightest”.
 - Developing processes which tie individual development plans to installation and agency goals and objectives.
 - Eliminating non-value added business processes.
 - Implementing and promulgating effective cost management.
- Provide aerospace products and capabilities by:
 - Enabling NASA to conduct more missions “better, faster, and cheaper,” thus reestablishing NASA as a premier research and development agency.
 - Reducing cost and development time for products and services.
 - Incorporating “best practices” of private industry and other government agencies in everyday operations.
 - Broadening participation in training activities across disciplines to create partnerships and improve mutual understanding.
- Generate knowledge by:
 - Collaborating with old and new, internal and external partners to enhance the quality of the PM workforce.
 - Developing and applying innovative training approaches with greater relevancy and cost effectiveness, i.e., distance learning technology, participative learning strategies.
- Communicate knowledge by:
 - Supporting team-based strategies that leverage the expertise of NASA workforce involved in the effective management and control of resources.
 - Disseminating information and technology tools throughout the NASA PM community that facilitate work performance and achievement of agency and installation goals, i.e., intra-net web sites, electronic meeting system.

Like the *NASA Strategic Plan*, the *PMDP Handbook (Version 3.0)* is a dynamic document, requiring periodic review and modification. Updates will be distributed in hard copy and posted on the web as part of the *NASA Professional Development Guide* at:

<http://www.hq.nasa.gov/office/codef/codeft/pdhub.html#Introduction>

The specific goals and objectives of the PM Career Development Implementation Plan are:

Goal 1: Ensure an evolutionary PM career development process that supports continuous improvement and reflects the changing environment.

- Objective 1: Publish and maintain career development guidance that includes knowledge, skills, and experiences expected at each career stage.
- Objective 2: Identify training needs and develop a PM agency-wide curriculum.
- Objective 3: Publish and maintain a list of current training opportunities.
- Objective 4: Identify types of development opportunities and experiences.

Goal 2: Satisfy the organization's current and future skill needs.

- Objective 1: Conduct a 5-year skill needs' assessment at each installation.
- Objective 2: Develop an action plan to fulfill the needs identified in the assessment.
- Objective 3: Encourage on-the-job cross-training opportunities within the PM community to include inter- and intra-installation rotational assignments.
- Objective 4: Promote the mobility of individuals across the PM community to most effectively satisfy dynamic workload demands.

Goal 3: Satisfy the employee's career needs for challenge, growth, development, and enrichment.

- Objective 1: Enable employees to become self-reliant and take responsibility for their training and career development.
- Objective 2: Establish IDPs for all PM employees.
- Objective 3: Emphasize the supervisor's responsibility to identify options for and remove barriers to employees' career development.
- Objective 4: Develop a mentoring program with a corps of trained mentors for NASA PM employees.
- Objective 5: Obtain American Council on Education accreditation of APPL curriculum, allowing for graduate credit for NASA PM employees.

Goal 4: Improve management and control of resources.

- Objective 1: Incorporate project management principles and agency initiatives into curriculum.
- Objective 2: Broaden curriculum to emphasize the importance of effective interpersonal skills, teamwork, and customer service.
- Objective 3: Establish mechanisms to routinely share information and tools.
- Objective 4: Provide regular opportunities for face-to-face interaction and information exchange, and create cross-disciplinary understanding.

APPENDIX H

NEXT STEPS

Subsequent goals of the PM career development initiative include:

- Regular update of the *PMDP Handbook (Version 3.0)* to accommodate agency and installation requirements.
- Execution of the NASA APPL Implementation Plan that includes the following elements:
 - Updating the PM agency-wide curriculum, incorporating project management principles and agency initiatives into curriculum.
 - Expanding general competencies curriculum, as required.
 - Conducting a 5-year Skill Needs Assessment at each installation and developing an implementation plan that addresses identified needs.
 - Expanding and publicizing installation and agency cross training, rotational, and mobility opportunities.
 - Enhancing IDP, coaching, and mentoring training programs.
 - Enhancing mechanisms to routinely share information and tools within the NASA PM community, i.e., best practices, technology, conferences.
 - Establishing partnerships with other technical and administrative disciplines within NASA, between federal agencies and with national and international industry and academic partners.

APPENDIX I

GLOSSARY OF TERMS

Activity: A task within a larger project which must be completed on time, within schedule, and with quality.

Attitudes: Pre-dispositions to behaving in a certain way. Sometimes they are manifestations of innate talents.

Career Development: Systematic development designed to increase an employee's potential for advancement and career change through classroom training, reading, work experience, and other developmental experiences.

Career Level: Level of career development. The *PMDP Handbook (Version 3.0)* uses a model consisting of four levels – project team member, subsystem manager, system manager, and program manager. These terms are individually defined in the model, Section 5.

Certification: A process that formally recognizes professionals for achieving expertise and excellence in their field. Certification programs are sponsored primarily by states and professional associations. Certification requirements typically consist of specific types of formal education, experience, character references, and passing an examination. To maintain certification, there may also be a continuing education requirement.

Coaching: A general competency defined as clearly communicating performance expectations to peers and employees; openly sharing information for the benefit of the organization; modeling and communicating the values, behaviors, and work practices expected of the workforce; providing constructive feedback. Coaches also model and communicate the values, behaviors, and work practices expected of the workforce. Like a mentor, coaches provide constructive feedback. Coaching is normally done in the context of a supervisor-employee relationship and can be a daily activity.

Competency: A generalized subject/performance area for which the individual must be capable to perform adequately at the appropriate stage of career development. In order to perform effectively, one needs to master both the general and the relevant technical competencies for one's job category.

Computer Based Training (CBT): CBT consists of instructional information displayed on the computer, including visuals and quizzes. Advanced CBT can be non-linear in format and interactive with the student.

Continuous Learning: Defined as grasping the essence of new information; mastering new technical and business knowledge; recognizing one's own strengths and weaknesses; pursuing self-development; seeing feedback from others and opportunities to master new knowledge.

Continuing Professional Education (CPE): Courses available to NASA personnel that upgrade knowledge and skills in job related areas to enhance job performance.

Developmental Activities/Experiences: Structured work/training experiences, agreed to between employee and supervisor, with well-defined objectives intended to enhance job knowledge and skills. May be a combination of structured “on-the-job” activities and formal classroom training.

Formal Training: Classroom training with an instructor that usually includes visuals (e.g., vu-graphs), training manuals, student workbooks, and quizzes.

General Career Path(s): A diagram illustrating typical job progression opportunities and options, designed to assist employees in planning and pursuing their career goals.

General Competency: General competencies apply across all PM job categories, regardless of specific job category and organizational level. Knowledge/skills in the general competencies are cross-functional and facilitate organizational and interpersonal collaboration, both internal and external to one’s organization. The level of general competency ordinarily increases consistent with career development.

Individual Development Plan (IDP): Plan jointly generated by an employee and his/her supervisor that documents the employee’s short- and long-term career goals and the training and developmental experiences necessary to mutually achieve these goals and organizational enhancement.

Installations: A term used to collectively refer to NASA Headquarters and the NASA Centers.

Intact Work Team Training: Simultaneous, formal training of an entire work team.

Integrated Financial Management Project (IFMP): Agency-wide project designed to improve financial management processes consisting of the following objectives:

- Standardize financial management business processes that are JFMIP-compliant.
- Provide current, meaningful, and timely financial information for both internal and external customers.
- Acquire an integrated, standardized computer-based system to support financial management processes.

IFMP strategy for accomplishing the above objectives includes an agency-wide Business Process Reengineering (BPR) effort, the implementation of full-cost budgeting, accounting, and management practices; the acquisition of commercial off-the-shelf software, and the inclusion of the Centers in key aspects of the project.

Knowledge/Skills: Both general and technical competencies consist of multiple knowledges/skills. These knowledges/skills are required to achieve success in job performance and are measured by the achievement of observable learning objectives.

Learning Objectives: Learning objectives reflect the expected performance level required to be competent. They are expressed in objective, behavior terms that enable measurement of achievement by employees and their management.

Mentoring: Defined as counseling others, through formal or informal methods; willingly serving as a role model; sharing organization insights and lessons-learned; providing sound advice on career development goals, strategies, and options.

On-the-Job Training: Informal training received by an employee in the work place from a more senior peer, mentor, or supervisor.

Performance Measurement System (PMS): A methodology for managing a system by monitoring appropriate status indicators and comparing them with a standard.

Position: A specific job consisting of all the current major duties and responsibilities assigned or delegated by management.

Program: A related series of undertakings that continue over a period of time (normally years), which are designed to pursue or are in support of a focused scientific or technical goal, and which are characterized by: design, development, and operations of systems; relatively high funding levels; firm schedules; and firm technical and/or scientific objectives.

Project: A defined, time-limited activity with clearly established objectives and boundary conditions executed to gain knowledge, create a capability, or provide a service as part of an overall program.

Technical Competency: Technical competencies correlate to the functional expertise required by one's job and do not automatically generalize to more than one job category. The knowledge/skills that comprise each technical competency specifically relate to job content.

Telephone-Based Training: Audio-based training in the telephone that is similar to radio-based training. In preparation for the telephone discussion, the student reads material and does case studies, as assigned. The instructor answers the student's questions about the assignment and makes new assignments.

Train-the-Trainer: A training approach that teaches a core group of subject matter experts the format and content of formal training classes. The subject matter expert then instructs others using the material and design format.

Web-Based: Information/data that is displayed on the Internet (World Wide Web) and accessible through the use of web-based software and a computer workstation.

APPENDIX J

REFERENCES

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